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ABSTRACT

The background of online information retrieval at the Institute for Medical Literature (IML), South Africa's center for providing such services to the country's biomedical community, is briefly sketched as an introduction to this description of IML's program to train medical librarians in online searching techniques. Materials used in the training courses are discussed under the following headings: (1) printed materials; (2) audiovisual presentations; (3) simulation techniques, especially the use of Mediatron, a system which faithfully replicates online searches; (4) computer-assisted instruction using a program called *MEDLEARN*; and (5) hands-on online practice in searching medical databases. An analysis of three courses held up to the end of 1978 provides a breakdown of course components in terms of lectures, exercises, and audiovisual aids. The results of a course evaluation survey are also reported. References are listed. (FM)

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ON-LINE TRAINING IN AFRICA

by

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ON-LINE TRAINING IN AFRICA

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Abstract

The training activities of IML, the South African MEDLARS center, is described. Due to the absence of inexpensive data transmission facilities, particular attention is given to designing courses in such a way that trainees acquire enough competence to make meaningful use of overseas vendors without costs running beyond an acceptable level. The integration of search emulators (CIS MEDIATRON) and CAI programs (MEDLEARN) into the courses, combined with the utilisation of advanced data transmission techniques, is described.

Background

The use of American or European on-line vendors by countries in Africa is a fairly recent development. As far as can be determined, the Institute for Medical Literature (IML) (the South African MEDLARS Center) was the first organisation in Africa to access an overseas data base, and that as recently as March 1976 when NLM's MEDLINE was accessed via the Paris TYMNET node (1). Lockheed and SDC were first accessed in November 1976, by the Anglo-American Corporation's Information Service. Other organisations were quick to follow, and today there are some thirty organisations in South Africa using the various major vendors.

Now this may sound insignificant compared to activity in the Uni-

ted States and Europe, but when one takes into account that the economically active part of the population in South Africa equates to some 2 per cent of the population of the USA or Western Europe (2), I feel we are not doing so poorly. The major stumbling block preventing many libraries and information services from using overseas vendors is the absence of cheap telecommunications, and all use at present is on a dial-up basis using the telephone network at a rate in excess of $3 per minute. The South African PTT is currently considering various proposals, amongst others the establishment of a node linking SAPONET, the national data transmission network, to the international networks (3).

It can be readily understood therefore that telecommunications costs in many cases would be of more importance to online users than computer costs. Under these constraints, any searching need to be done as efficiently as possible to keep costs down.

When the Institute for Medical Literature was established in 1976 to render bibliographic retrieval services to the local biomedical community, several members of staff were sent to NLM to attend online training courses. A country-wide information service was launched in August 1976, but with some end users situated over a thousand miles away, a need was felt to have decentralised service points established as soon as possible.

It is NLM policy not to issue USERID's to organisations who have not sent at least one searcher to a MEDLARS training course. In

terms of the *quid pro quo* agreement between the South African Medical Research Council and NLM, the IML would assign USERID's to local libraries, bearing in mind NLM's policy on these matters.

As no formal courses in on-line techniques were at that time offered by any organisation in South Africa, and economics ruled out sending many more persons for training abroad, IML had perforce to take on a training task in addition to its primary mission of running an information service.

Training Program

The first formal training course was held in July 1977. Subsequent courses were held during June and November the following year and at regular intervals since then. Initially at least the courses were very closely patterned on those conducted by NLM, and I would like to acknowledge the assistance provided by that great institution. Due to our rather peculiar circumstances - high telecommunications costs, and printouts taking some two weeks to reach us - we had to introduce some rather unique features.

Our courses try and impart the *principles* of systems use and profile formulation for particular data bases on the assumption that a good searcher is 'born', not the result of training *per se*. Like the curate's egg, it is (hopefully) good in parts.

The first course was run over a period of three days, but is was found that trainees were suffering from an information overflow in that more background knowledge was assumed from the partici-

pants, all experienced medical librarians with many years of practice behind them, than they did in fact possess.

Although the course content was not increased for the second course, it was spread over a period of five days to allow for more repetition of basics enabling trainees to absorb the information at a more relaxed pace. For the third course, lecture material, including elementary exercises in search formulation, was sent to trainees two weeks before commencement of the course. Some pre-course hands-on experience had also been provided by means of computer-aided instruction thru use of the *MEDLEARN* program, from the third course onwards.

Teaching Media

Various media are used in the presentation of the course to enliven what could otherwise become too much straight lecturing. The mediamix will be discussed under the following headings:

- Printed Materials
- Audiovisual Presentations
- Simulation Techniques
- Computer-aided Instruction
- On-line Practice

1. Printed Materials

No course can effectively be offered without the use of printed manuals, guides and other 'passive' materials. Present day on-line systems provide so many sophisticated capabilities that

even the most experienced user sometimes has to consult the system manual to refresh his memory. A comprehensive reference manual as a guide to system capabilities is therefore indispensable. The same applies to the different data bases due to the lack of standardisation regarding input, searchable elements, and output formats.

2. Audiovisual Presentations

Although the use of audiovisual materials such as films, videotapes, tape/slide shows and audio cassettes is a passive way of transferring information, they have certain advantages such as ready availability and independence of system availability (4). A disadvantage of course is that they often are out of date soon after production, and, unless produced in-house, may not accurately reflect local conditions.

Various slide-tape programs on the MEDLINE system produced by the National Audiovisual Center in the USA have been used during the courses so far held by IML. Because they were produced particularly with American audiences in mind, IML adapted them to local conditions by using some of the slides from a set, replacing other with up-to-date slides, and providing a new sound track.

3. Simulation Techniques

Major savings in cost and time would be made if the trainee could have demonstrated the overall concept of an on-line search with-

out being connected to a computer and without using the time of a trained demonstrator (5).

A multi-media teaching aid to provide just such a facility has been developed by Central Information Service at London University. The system, known as a Mediatron, faithfully reproduces an on-line search on a VDU, supplemented with commentary and visual images provided by a synchronised slide projector. It is thus possible to demonstrate steps in conducting an on-line search such as logging on, use of passwords, file selection, basic commands, the concept and use of Boolean logic, the various formats in which references can be printed on- and off-line etc (6).

The Mediatron utilises the following media:

- Digital display via VDU providing an exact replica of an on-line search. The speed of input and response is identical to the original on-line search, creating the impression of watching a live on-line search in progress.
- Audio response synchronised with the digital signals to explain or elucidate the images appearing on the screen.
- Slide images of abstract journals, thesauri, dictionaries or any other visual image that may further clarify the point.

In using the Mediatron during our courses at IML, it was found that the multimedia kits acquired from London University could not continuously be utilised without interruption, as a half-hour session without live intervention tended to loose some of

its impact. By stopping the program at strategic points and explaining or repeating some of the steps, trainee's attention could be focussed much more beneficially on the various steps being demonstrated.

As with bought-in audiovisuals, in-house programs have been developed reflecting not only changes to the software used by the various systems such as NLM, LRS and SDC, but also co-ordinating them much more closely with IML's own training program.

4. Computer-aided Instruction (CAI)

It has been stated that CAI training programs must be competitively effective in their teaching capabilities, take the least amount of user time, and be cost-effective in order to assure success (4). A good CAI sequence will be at least as effective as conducting a live session of the same duration. It conveys instructional messages while simultaneously preparing the user for the type of interaction which he must get accustomed to in working with an on-line system. CAI is a dynamic teaching process as opposed to the passivity of reading printed guides or listening to an instructor. The hands-on experience is an important element in the learning process and is ever-present in the CAI interaction.

The National Library of Medicine provides an extensive training program for all searchers using the MEDLARS data base, and has invested considerable time and effort in the exploration of various educational methods (7). Following its experiences with

MEDLEARN, it supported an additional effort to design and develop a CAI package on the MEDLARS system, to be resident on the Library's in-house computer system and integrally co-ordinated with NLM's training programs. The current program is known as *MEDLEARN* to distinguish it both from MEDLINE and the earlier ***MEDLEARN*** (8).

Based on the experience of IML's own staff in undergoing training at NLM and being able to use *MEDLEARN* as an introduction to the MEDLINE system, they were fully aware of its significant value in training. This was further underscored when the first local course had to be presented without such a facility. Although the CAI program was of course available on the NLM computer, the high cost of telecommunications ruled it out as a practical aid.

A copy of the *MEDLEARN* tapes for use on a local computer was accordingly obtained from NLM. *MEDLEARN* was successfully running about one week before IML's second course in June 1978, and, with certain restrictions, could be integrated with this course. A hard-wired terminal had to be installed at IML for accessing the program due to communications limitations in the computer bureau's operational set-up. It was the first program of its kind available in South Africa, and made a remarkable difference to the success of this course compared to the previous one.

A dial-up facility was installed two weeks before the following course. Not only could trainees avail themselves of the opportunity of getting some hands-on experience before attending the course, but earlier trainees could use it as well to refresh

themselves on special search capabilities of MEDLINE which they may not have used much, if at all, since attending the course.

5. On-line Practice

The whole approach with IML's training courses is based on the assumption that it can at best impart knowledge required to access the system, i.e. logging-in, command languages, file selection, and file structure. No attempt is made to go into the theoretical aspects of indexing and/or information retrieval. This, it is felt, is very much the area of formal academic courses. Our training deals basically with the practical aspects of computerised information systems.

The final test as to the success or otherwise of such training is of course when the trainee is actually accessing MEDLINE and related data bases to retrieve citations relevant to an actual search request. In order to make the on-line practice meaningful to the trainee, each one is ask to bring along either an actual request with which he had to deal in his own library, or else one based on a topic of particular interest to himself.

During the last day of the training course, each trainee is given an opportunity to access a data base of his choice against which to run his request. In order to enable him to do the search without being disturbed by other trainees watching over his shoulder (the "fishbowl" effect), and yet enabling them to watch his endeavours, the terminal is also linked to a remote video screen which displays his search as it is progressing. The

trainee doing the search has an instructor on hand to guide him, whilst another instructor can comment on the search as seen on the video screen for the benefit of the other trainees.

The novice searcher is ill at ease at best of times, a feeling made worse when his pick and press efforts at the terminal is calculated at 5 cents a second for telephone time alone. Although we have a special budget for training expenses and trainees are assured that we will not go bust due to their lack of skill, it is non the less a factor to keep in mind.

An MFE 5000 buffered terminal used for normal search purposes, was accordingly introduced into the training program. In this configuration, the complete logging-in process and the basic search profile is entered onto tape via a video terminal before the call is made. The trainee is accordingly not concerned about his typing speed, and can correct any typing errors before transmission.

The call is then made with an automatic dialler, and logging in is completed at the press of a button. The interactivity of the search procedure is maintained as the basic profile is transmitted faultlessly at maximum speed a line at a time with system response in the normal manner. Modified search statements can be entered via the keyboard as required.

Although a twin cartridge terminal like the TI ASR 733 could to some extent be used for similar procedures, the absence of paper

printout was felt to be a liability. In the IML configuration, a standard TI Silent 700 743 is used as a slave printer to provide a printout of input and output.

Course Structure

An analysis of the three courses held up to the end of 1978 provides a breakdown of the basic components, i.e. lectures, excercises and audio-visual aids. The number of hours devoted to each is given in Table 1, with the percentage of total time in brackets. As can be seen, the courses averaged just over 22 hours duration, compared to the 13,5 hours average found by BERK & DAVIDSON (9) in their 1976 survey of MEDLINE training conducted by thirteen American schools of library science that had been assigned an educational identification code by NLM, an offer first made to library schools early in 1975.

TABLE 1 : COURSE BREAKDOWN

	Course I		Course II		Course III	
	Hours		Hours		Hours	
Lectures	10,33	(46,19%)	8,25	(37,09%)	10,83	(48,32%)
Audio-visuals	2,58	(11,53%)	4,33	(19,46%)	2,08	(9,28%)
Exercises/Practice	9,25	(41,36%)	9,66	(43,43%)	9,50	(42,39%)
	22,36		22,24		22,41	

Evaluation of the courses (discussed in more detail in the following section) indicated that trainees preferred the opportunity to participate offered by the informal lecturing method to the pas-

sive role they play in following the audio-visual presentations. All A/V kits were therefore carefully screened and selected for inclusion in the third course, resulting in less than 10% of the total time being allocated to these aids. The Mediatron, with its realistic imitation of the on-line process, and stop-start capability allowing live discussion, proved to be one of the most useful of these aids.

Course Evaluation

Although it is possible to form an overall impression of the success or otherwise with which trainees attended a particular course based on the response to exercises, it was felt that a more objective evaluation was needed that could serve as the basis for improving following courses.

At the end of the second course, trainees were each handed an evaluation form for completion before they left. They were not asked to identify themselves on the form, and most questions could be answered by indicating their opinion on a zero-to-ten scale with midpoint regarded as the ideal. It was intended to identify weak spots in the program in the light of experience gained from the course.

Interesting facts obtained from the evaluation was that participants felt that slightly too much theory was presented, scoring 5,8 with a range of 5 to 8; the exercise content was scored at 4,5 with a range of 3 to 6, indicating a need to provide slightly more time for exercises. Terminal usage at 4,4 with a range

of 3 to 6 indicated a need for more opportunity for hands-on experience.

Conclusion

Offering a course in on-line information retrieval techniques should be carefully planned. Great demands are made on staff time and on technical and financial resources. There had best be a full commitment not to stint on any of these aspects, or it would be better not to make an attempt at all.

As REES *et al.* (10) point out, it is patently obvious that MEDLINE training cannot be provided by part-time amateurs. They are of the opinion that training can best be provided by a combination of library school educational expertise and operational expertise of MEDLINE searchers committed on a continuing basis to working with the system.

Until such time as South Africa's PTT provides international data transmission facilities at much reduced rates by linking SAPONET to the American and European networks, our use of overseas data bases would be restricted. Training by our library schools would accordingly remain to be of a theoretical nature, and organisations such as the Institute for Medical Literature would perforce have to bear the major training effort.

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